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shop from which an outsider can form a better judgment of the general management than by an observation of the tool-room. The best economy is established by securing none but the best tools at the outset, for in the long run they will be found the cheapest. As a rule, it is expensive trying experiments by purchasing tools of new and untried patterns or material. New machines and tools are often constructed so as to leave no reasonable doubt of their successful operation, but this is not invariably the case. It is always safe to buy those about the working of which there is no doubt. Second-hand machinery can often be obtained in good order at very low prices, if the purchaser has extra time at his disposal to look it up, but when machinery is much worn, its value is questionable at any price. It is not only easier, but a greater satisfaction, to take care of good tools than of poor ones.

### Making Wooden Pulleys.

A PULLEY over twenty-four inches in diameter should be built on a spider; all under that size can be made on a wood centrepiece about two inches thick, having a cast-iron flange, say eight inches in diameter for a twenty-inch pulley, with a hub and boss about three inches long. Four bolt holes should be made through the flange for bolting to wood centre. The latter should be a nice fit on the shaft, with key seat the same as for an iron pulley. After preparing the centerpiece by planing smooth and straight, make a templet, the length being about one sixth or one eighth of the diameter and two inches wide. By this mark out the amount of stuff for the required width of the face. The lumber should be about seven eighths or an inch thick, sawed out to the same circle as centerpiece. Plane straight and smooth, and make the butt joints a perfect fit; glue and nail on. If a flange is desired on each edge to keep the belt from running off, make the outside layer a little wider and allow it to lap over the face. Put the pulley into a lathe and turn it up. Thus made, it will be durable and will not easily break.—*B. J. Donaway in Scientific American.*

### The Proper Speed for Circular Saws.

THE *Lumberman's Gazette* says: "Nine thousand feet per minute—that is nearly two miles per minute for the rim of a circular saw to travel may be laid down as a rule. For example: A saw 12 inches in diameter, or 3 feet around the rim, 3000 revolutions; 24 inches in diameter, or 6 feet around the rim, 1500; 3 feet in diameter, or 9 feet

around the rim, 1000 revolutions; 4 feet in diameter, or 12 feet around the rim, 750 revolutions; 5 feet in diameter, or 15 feet around the rim, 600 revolutions. The rim of the saw will run a little faster than this reckoning, on account of the circumference being more than three times as large as the diameter. Shingle or some other saws, either riveted to a cast-iron collar or very thick at the centre and thin at the rim, may be run with safety at a greater speed."

### Useful Items for Office and Shop.

CEMENT FOR WOOD AND IRON.—A foreign journal speaks of a cement made of oxide of lead and concentrated glycerine, which unites wood to iron with remarkable efficiency. The composition is insoluble in acids, is unaffected by the action of heat, sets rapidly, and acquires an extraordinary hardness.

A SOLUTION of four ounces of sandarac, one ounce gum mastic, and four ounces shellac, in one pound of alcohol, to which two ounces oil of turpentine is added, can be recommended as a varnish over stained woods.

POSTAGE-STAMP MUCILAGE.—The following is said to be the formula for the mucilage used on the United States postage stamps: Dextrine, two ounces; acetic acid, one ounce; water, five ounces; alcohol, one ounce. Add the alcohol to the other ingredients when the dextrine is completely dissolved.

VARNISH for indoor painting is made by melting six parts of gum copal and adding two and a half parts of linseed oil. When cold the yield is  $6\frac{1}{2}$  parts of concentrated varnish, having the consistence of wax, as the loss on the gum amounts to one and four fifth parts. One part of this concentrated varnish mixed in the cold with one part of oil of turpentine yields two parts of very good varnish for inside work.

STEEL RUST.—According to the *Chemiker Zeitung*, articles of steel which have become rusty may be cleansed by brushing with a paste made up of thirty parts cyanide of potassium, thirty parts curd soap, sixty parts of precipitated chalk, and a sufficiency of water. Our contemporary adds that great care is required in preparing and using this poisonous mixture.

IMITATION MAHOGANY.—Brush over the wood with common ink; when that is dry brush it over with dragon's-blood mixed with methylated spirit in the proportion of one ounce dragon's-blood to one half pint of the methylated spirit. When that is dry, varnish with spirit varnish. Cost of dragon's-